

U.S. Application No. 09/680,371

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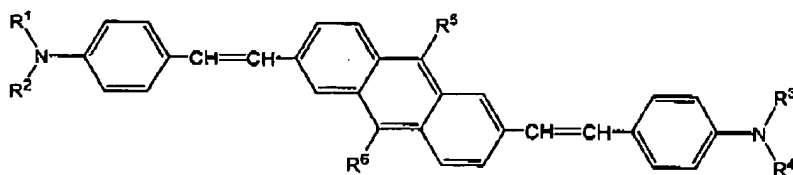
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IN THE CLAIMS

The following listing of claims replaces all prior listings:

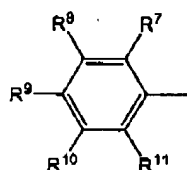
1. (Currently amended) A bis(aminostyryl)anthracene compound represented by formula [I], [II], [III], or [IV]

formula [I]:



where R² and R³ each denotes an unsubstituted aryl group, and R¹ and R⁴ each denotes an aryl group represented by formula (1)

formula (1)

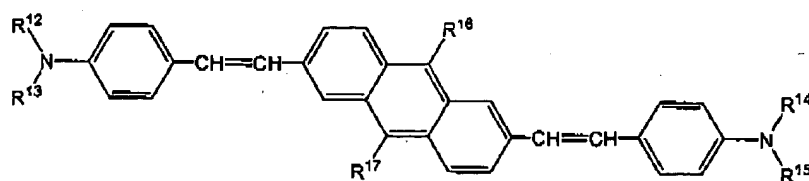


where R⁷, R⁸, R⁹, R¹⁰, and R¹¹ are identical or different groups, at least one of them being a saturated or unsaturated hydrocarbon oxy group or hydrocarbon group having at least one carbon; and R⁵ and R⁶ are identical or different groups, at least one of them being a hydrogen atom, cyano group, nitro group, or halogen atom

formula [II]

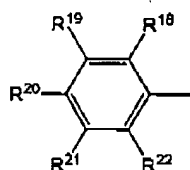
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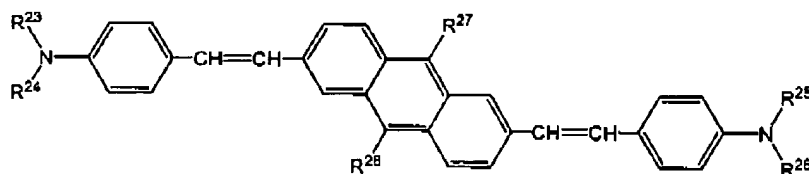
where R^{12} , R^{13} , R^{14} , and R^{15} are identical or different groups, each denoting an aryl group represented by formula (2)

formula (2)



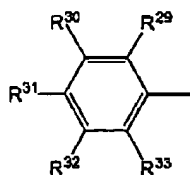
where R^{18} , R^{19} , R^{20} , R^{21} , and R^{22} are identical or different groups, at least one of them being a saturated or unsaturated hydrocarbon oxy group or hydrocarbon group having at least one carbon; and R^{16} and R^{17} are identical or different groups, at least one of them being a hydrogen atom, cyano group, nitro group, or halogen atom

formula [III]



where at least one of R^{23} , R^{24} , R^{25} , and R^{26} denotes an aryl group represented by formula (3), with the remainder being an unsubstituted aryl group

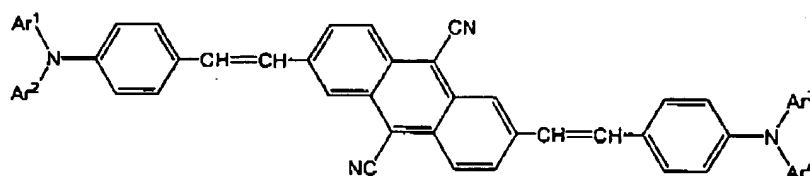
formula (3)



where R^{29} , R^{30} , R^{31} , R^{32} , and R^{33} are identical or different groups, at least one of them being a saturated or unsaturated hydrocarbon amino group; and R^{27} and R^{28} are identical or different groups, at least one of them being a hydrogen atom, cyano group, nitro group, or halogen atom.

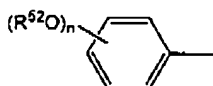
2. (Currently amended) A bis(aminostyryl)anthracene compound represented by formula (6)

formula (6)

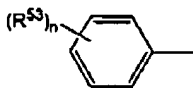


where Ar^1 , Ar^2 , Ar^3 , and Ar^4 are identical or different, each denoting an aryl group which may have a substituent, and if a substituent is present, said aryl group being one which is selected from aryl groups represented by formula (7), (8), and (9)

formula (7)



formula (8)



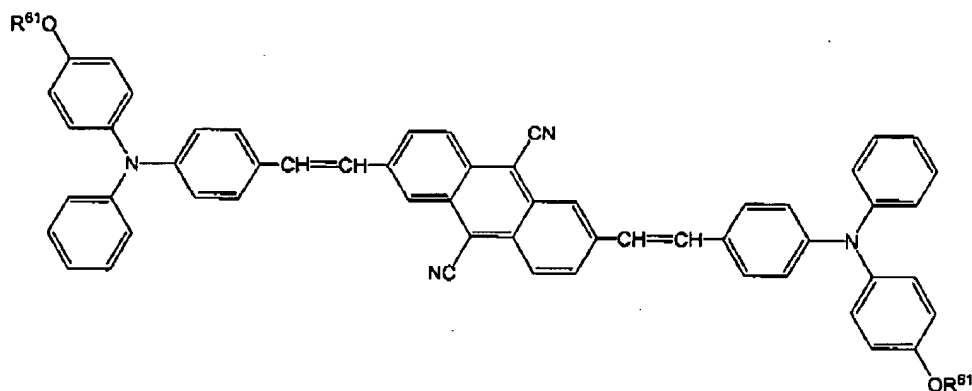
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where R^{52} , R^{53} , each denotes a saturated or unsaturated hydrocarbon group having one or more carbons; n is an integer of 0 to 6;

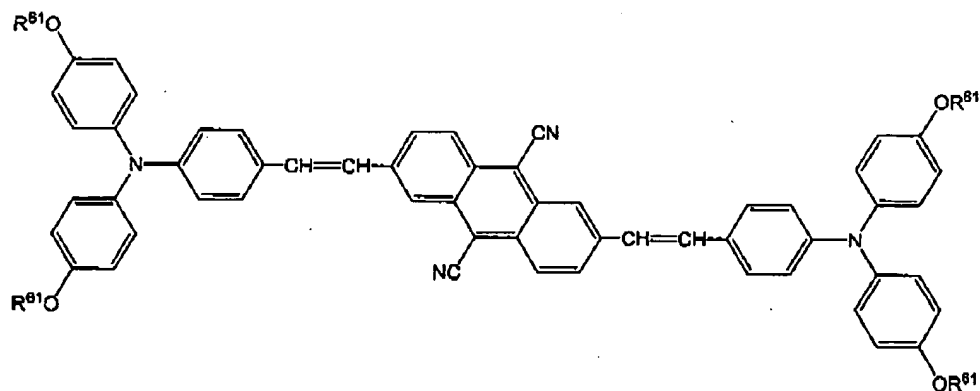
3. (Currently amended) A bis(aminostyryl)anthracene compound as defined in Claim 2, wherein R^{52} , R^{53} , R^{54} , each has from 1 to 6 carbons.

4. (Currently amended) A bis(aminostyryl)anthracene compound as defined in Claim 1 or 2 which is represented by formula (13), (13'), (14), (15)
formula (13)



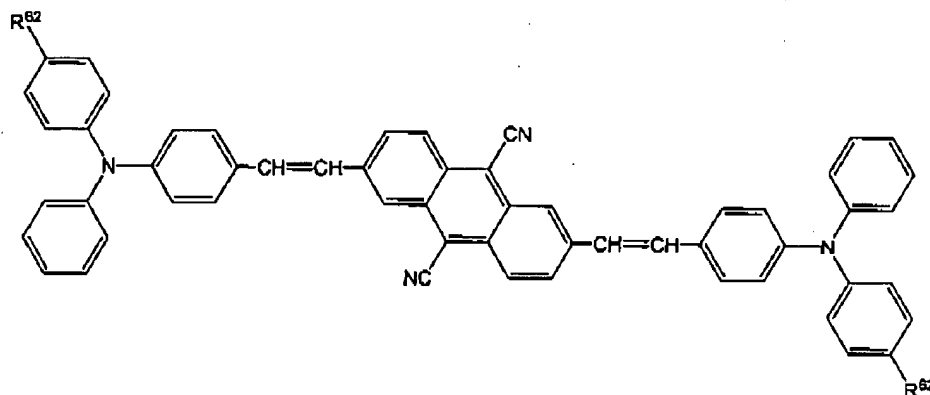
where R^{61} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms

formula (13')



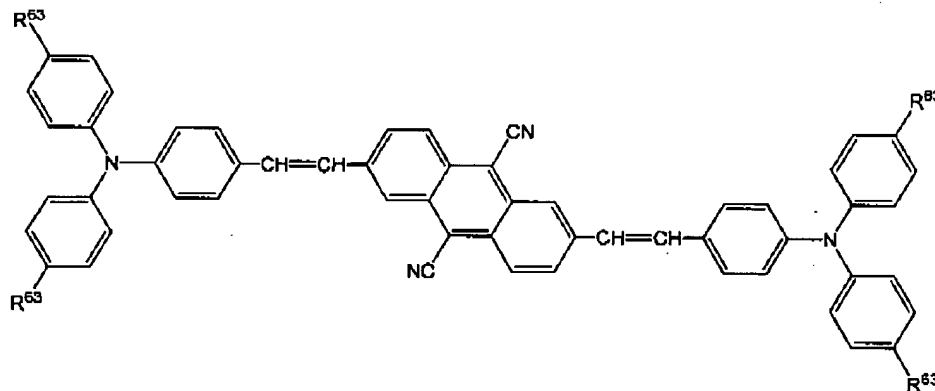
where R^{61} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms

formula (14)



where R^{62} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms

formula (15)



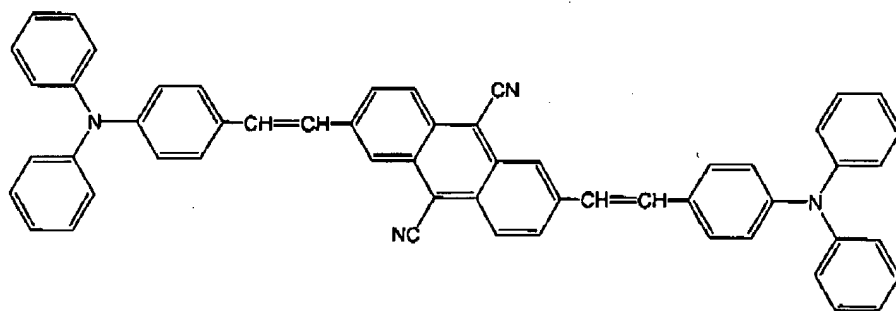
where R^{63} denotes a saturated or unsaturated hydrocarbon group or hydrocarbon oxy group having 1 to 6 carbon atoms.

5. (Currently amended) A bis(aminostyryl)anthracene compound as defined in Claim 1 or 2 which is represented by formulae (18)-1, (18)-2, (18)-2', (18)-3, (18)-4 or (18)-11

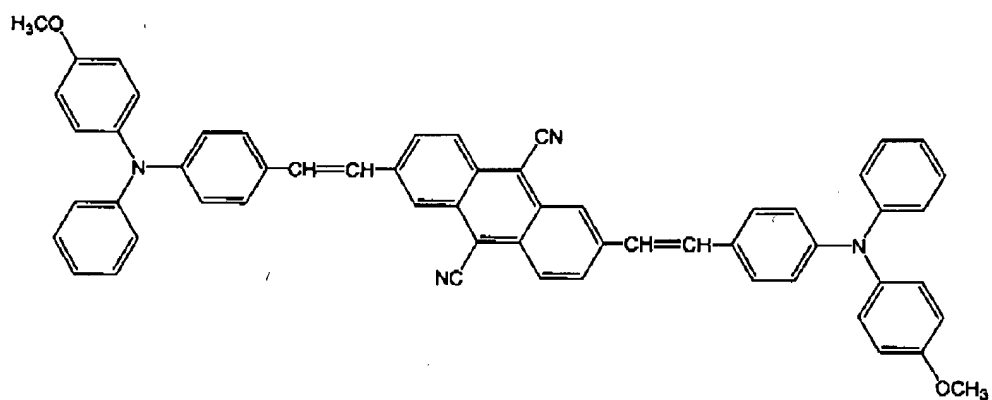
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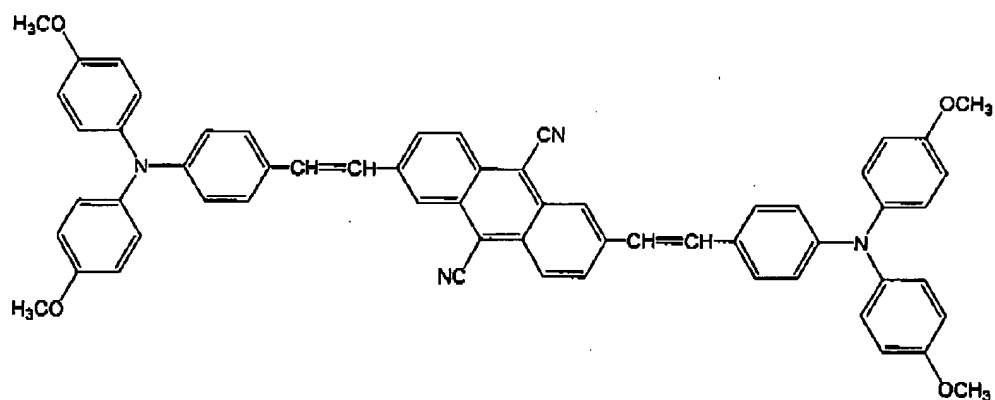
formula (18)-1



formula (18)-2



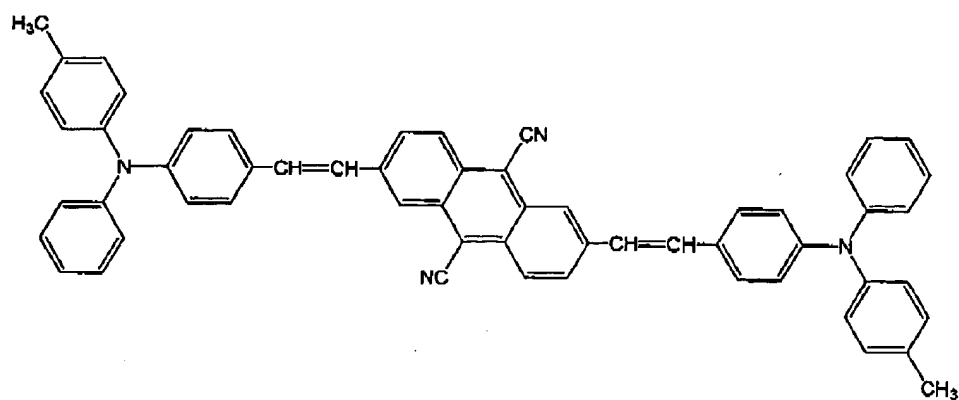
formula (18)-2'



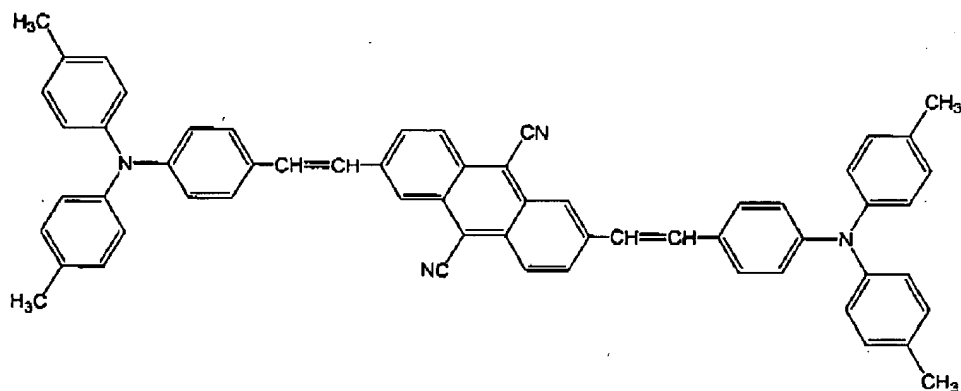
formula (18)-3

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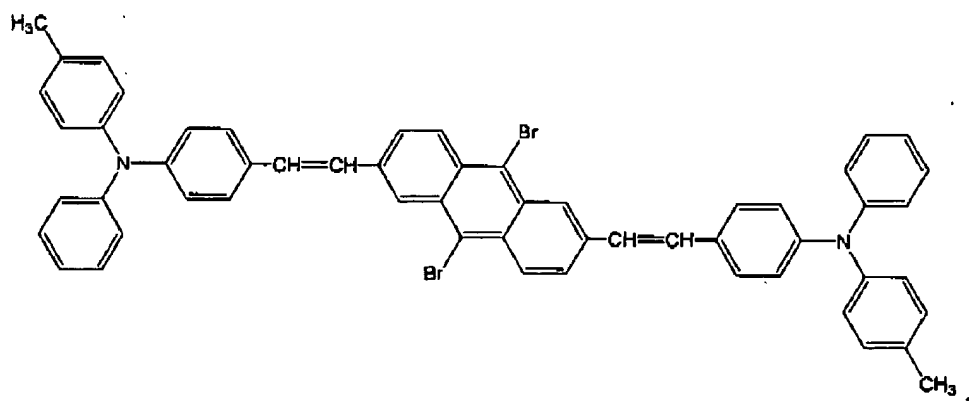
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formula (18)-4



formula (18)-11

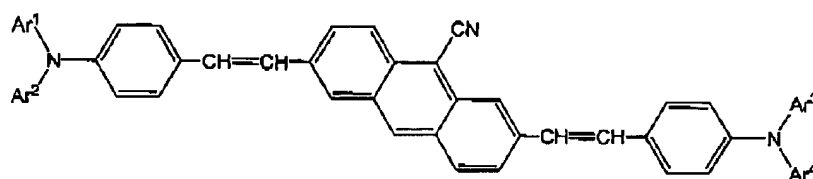


6. (Previously presented) A bis(aminostyryl)anthracene compound represented by formula (19)

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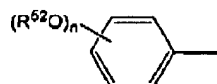
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formula (19)

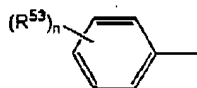


where Ar^1 , Ar^2 , Ar^3 , and Ar^4 are identical or different, each denoting an aryl group which may have a substituent, and if a substituent is present, said aryl group being one which is selected from aryl groups represented by the general formula (7), (8)

formula (7)



formula (8)



where R^{52} , R^{53} each denotes a saturated or unsaturated hydrocarbon group having one or more carbons; n is an integer of 0 to 6.

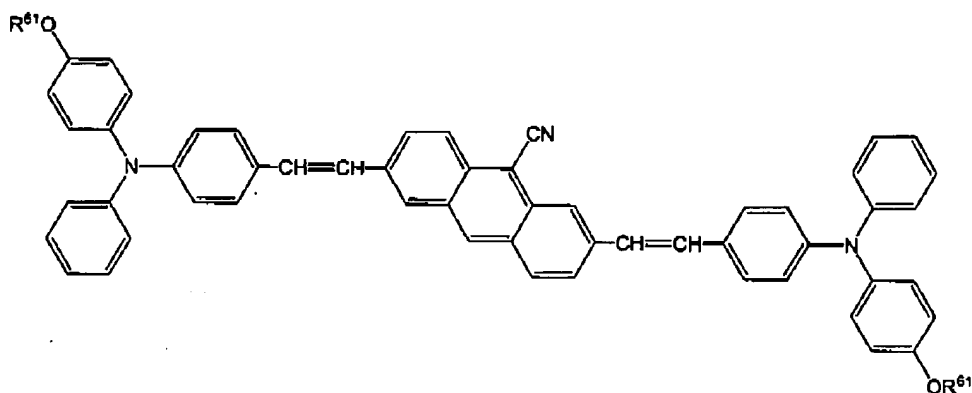
7. (Currently amended) A bis(aminostyryl)anthracene compound as defined in claim 6, wherein R^{52} , R^{53} , R^{54} , R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} each has 1 to 6 carbon atoms.

8. (Currently amended) A bis(aminostyryl)anthracene compound as defined in claim 1 or 6 which is represented by formula (20), (21), (22)

formula (20)

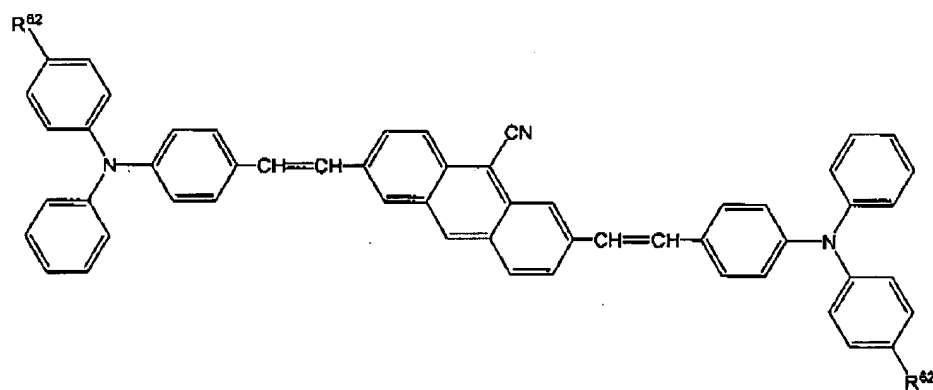
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where R⁶¹ denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms

formula (21)

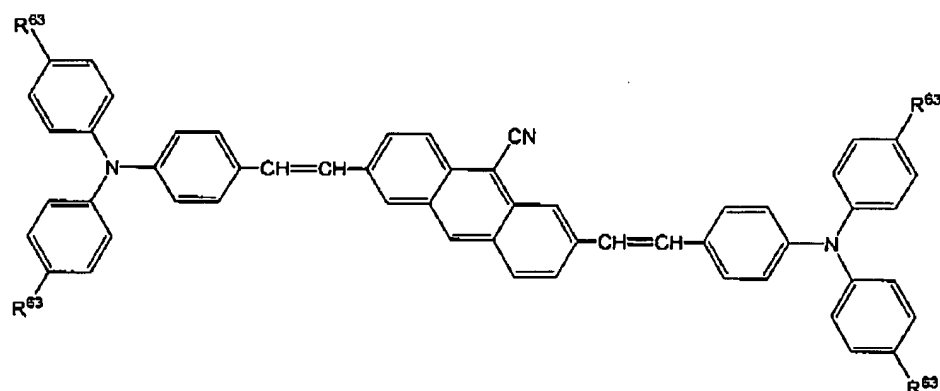


where R⁶² denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms

formula (22)

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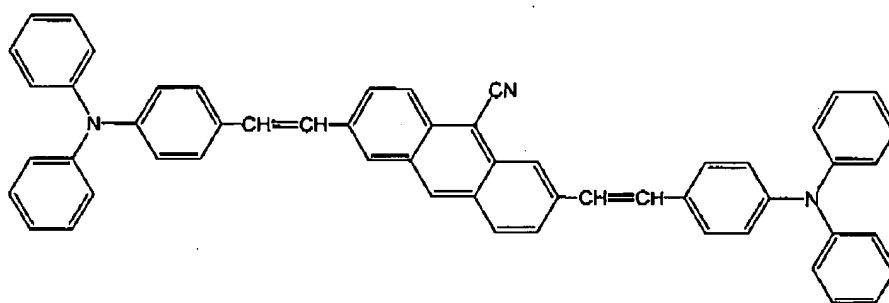
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where R⁶³ denotes a saturated or unsaturated hydrocarbon group or hydrocarbon oxy group having 1 to 6 carbon atoms.

9. (Currently amended) A bis(aminostyryl)anthracene compound as defined in Claim 1 or 6 which is represented by formulae (25)-1, (25)-2, (25)-2', (25)-3, (25)-4, or 25-(11)

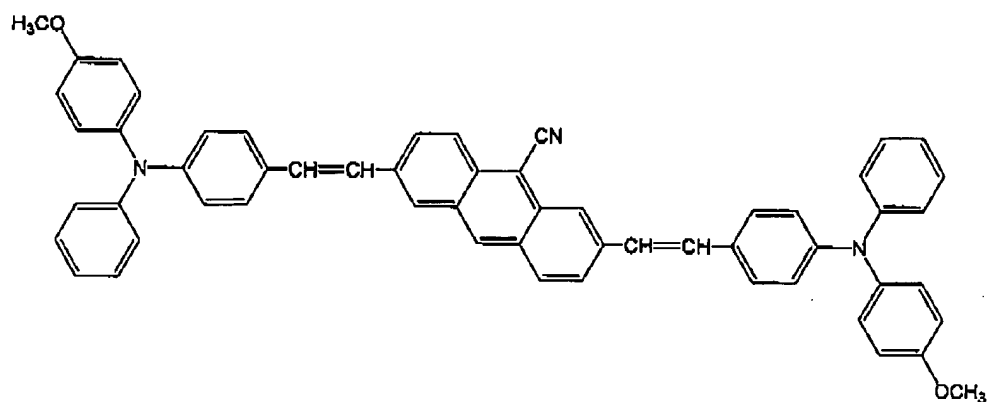
formula (25)-1



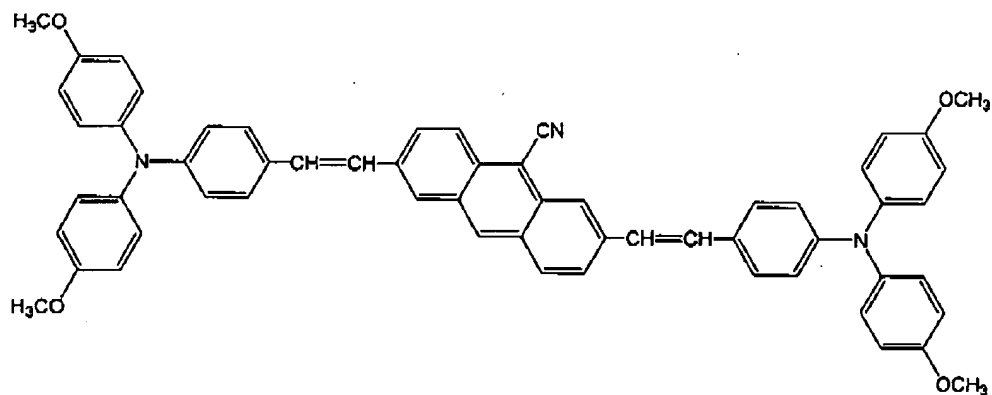
formula (25)-2

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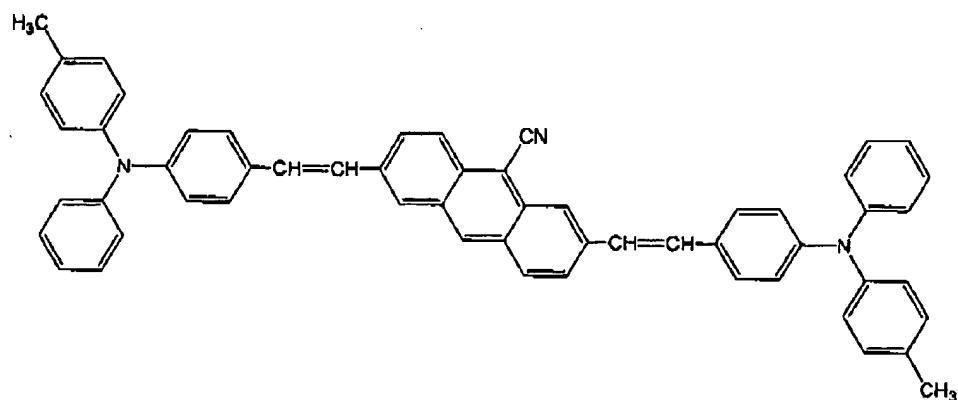
formula (25)-2'



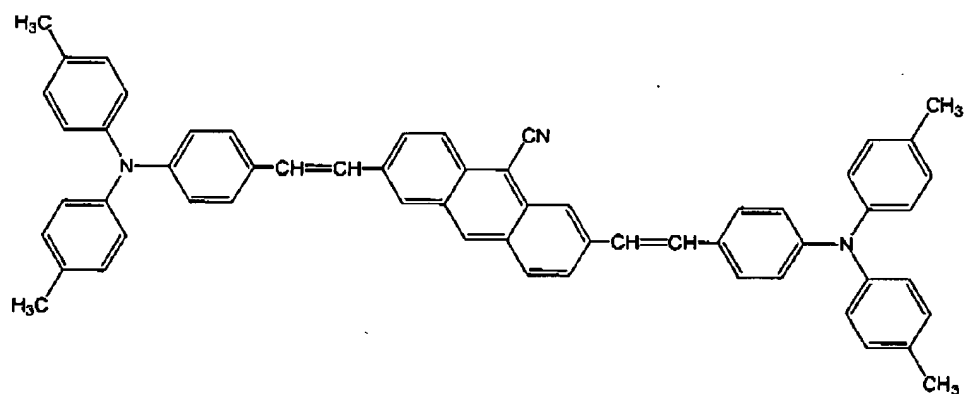
formula (25)-3

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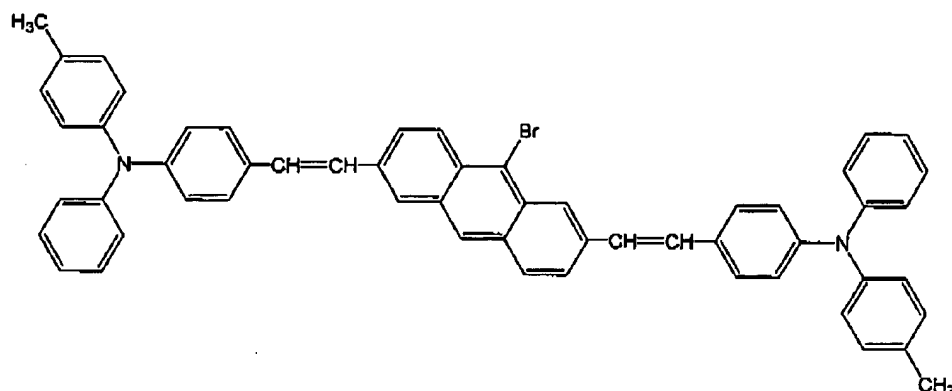
formula (25)-4



formula (25)-11

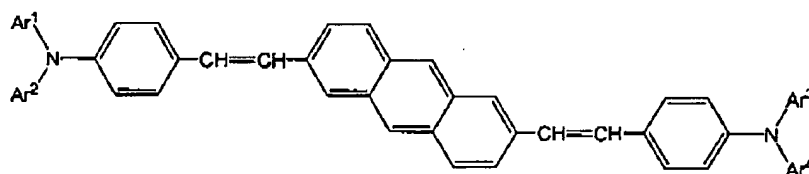
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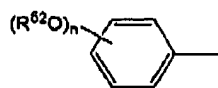
10. (Currently amended) A bis(aminostyryl)anthracene compound which is represented by formula (26)

formula (26)



where Ar^1 , Ar^2 , Ar^3 , and Ar^4 are identical or different, each denoting an aryl group which may have a substituent, and if a substituent is present, said aryl group being one which is selected from aryl groups represented by the general formula (7), or (8), (9), (10), (11), (12), (12'), or (12'')

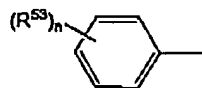
formula (7)



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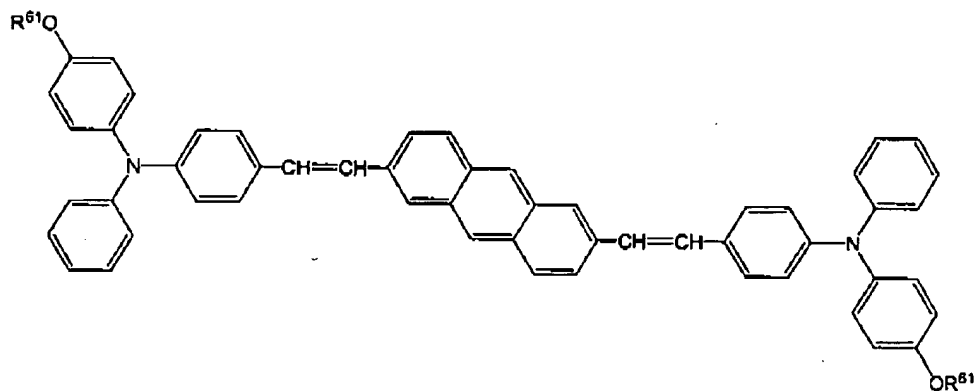
formula (8)



where R^{52} , R^{53} denotes a saturated or unsaturated hydrocarbon group having one or more carbons; n is an integer of 0 to 6.

11. (Currently amended) A bis(aminostyryl)anthracene compound as defined in Claim 10, wherein R^{52} , R^{53} , R^{54} , R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} each has 1 to 6 carbon atoms.

12. (Currently amended) A bis(aminostyryl)anthracene compound as defined in Claim 1 or 10 which is represented by formulae (27), (28), (29)
formula (27)

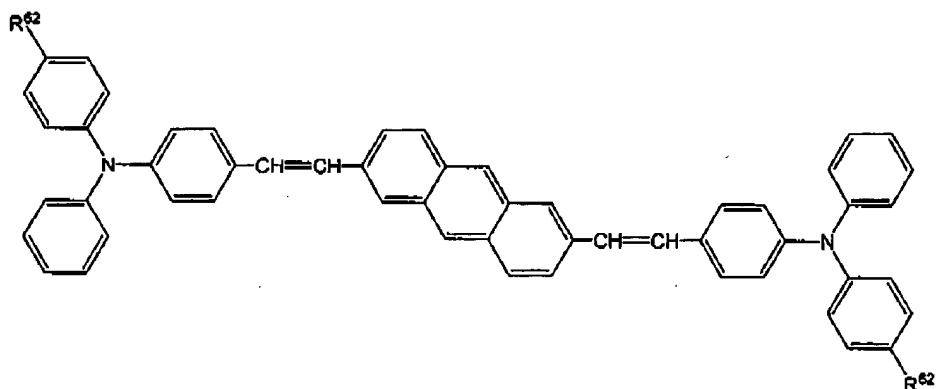


where R^{61} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms

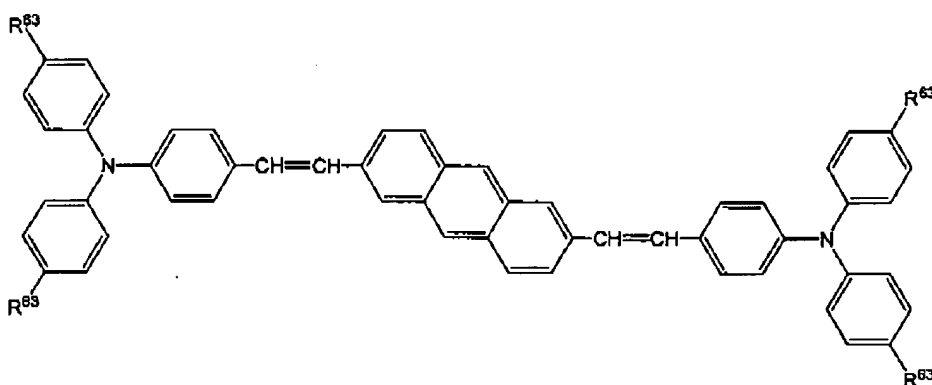
formula (28)

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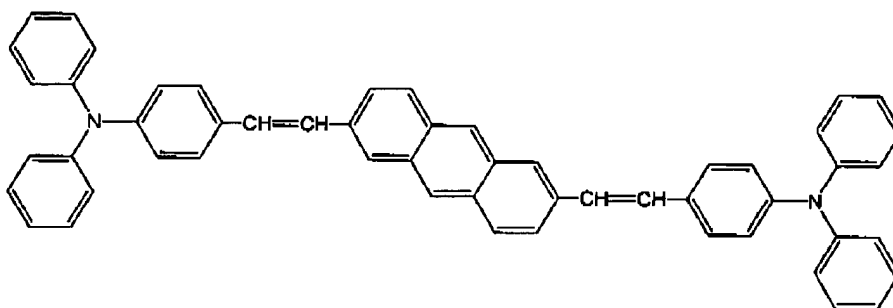
where R^{62} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms
formula (29)



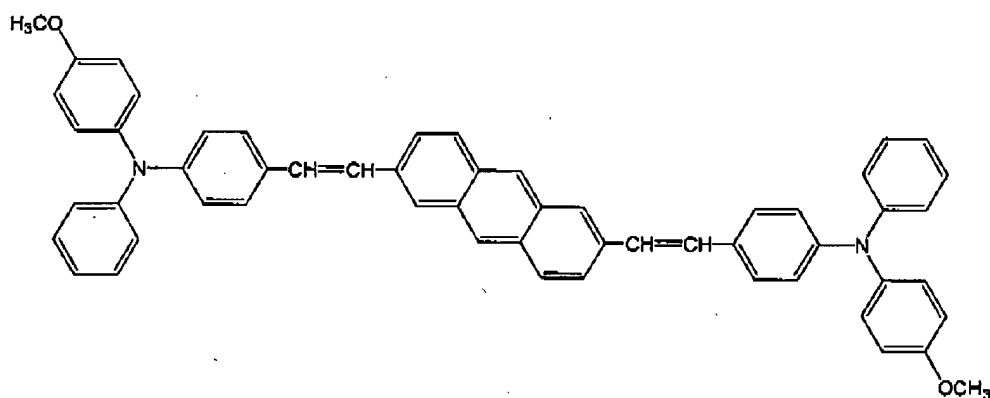
where R^{63} denotes a saturated or unsaturated hydrocarbon group or hydrocarbon oxy group having 1 to 6 carbon atoms.

13. (Currently amended) A bis(aminostyryl)anthracene compound as defined in Claim 1 or 10 which is represented by formulae (32)-1, (32)-2, (32)-2', (32)-3, (32)-4,

formula (32)-1



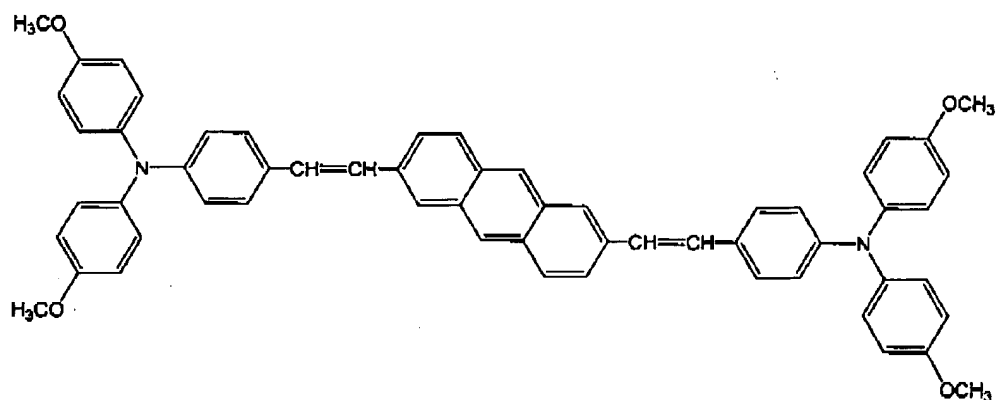
formula (32)-2



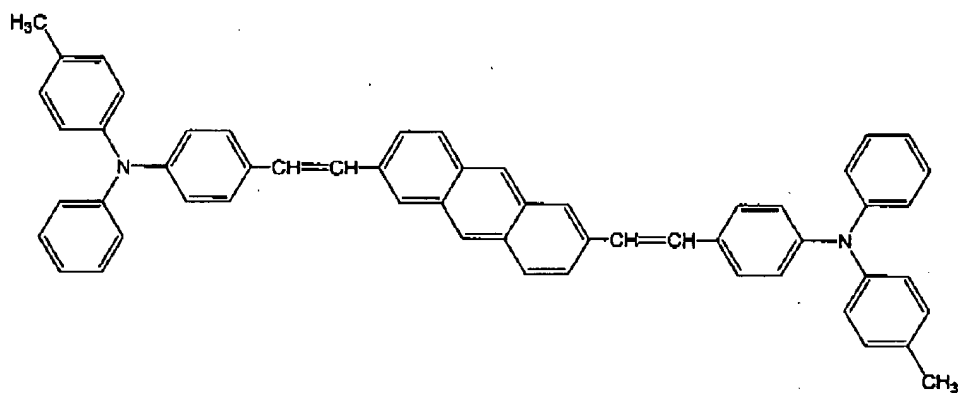
formula (32)-2'

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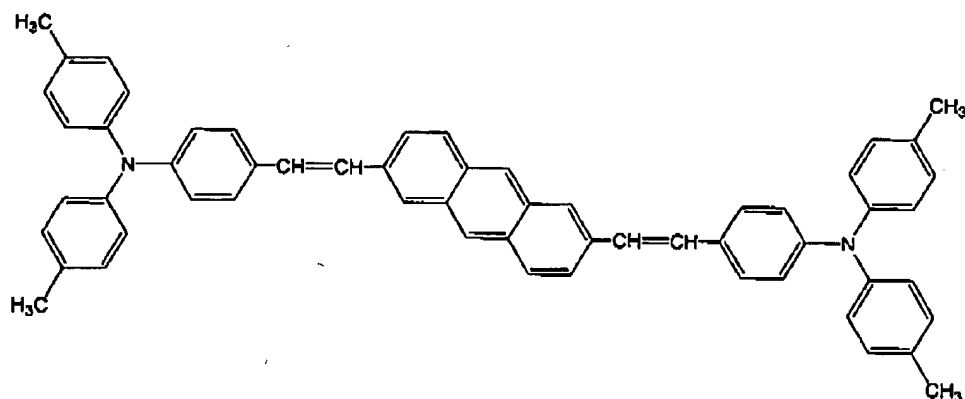
formula (32)-3



formula (32)-4

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14. (Cancelled)

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Cancelled)

23. (Cancelled)

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24. (Cancelled)

25. (Cancelled)

26. (Cancelled)

27. (Cancelled)

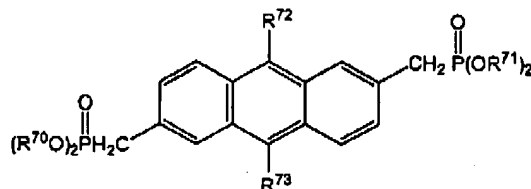
28. (Cancelled)

29. (Cancelled)

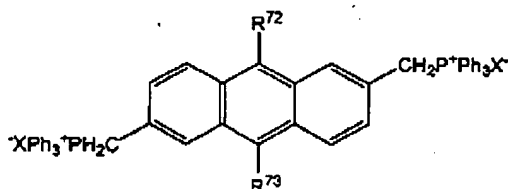
30. (Cancelled)

31. (Withdrawn) A diphosphonic ester or diphosphonium represented by the general formula [VII] or [VIII] below.

General formula [VII]



General formula [VIII]



(where R^{70} and R^{71} are identical or different, each denoting a hydrocarbon group; R^{72} and R^{73} are identical or different, at least one of them denoting a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom, and X denotes a halogen atom.)

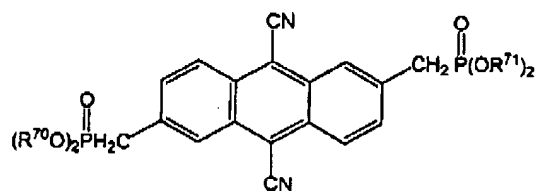
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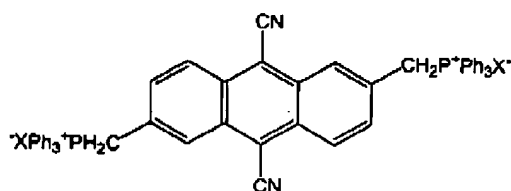
32. (Withdrawn) A diphosphonic ester or diphosponium as defined in Claim 31, wherein R^{70} and R^{71} each denotes a saturated hydrocarbon group having 1 to 4 carbon atoms.

33. (Withdrawn) A diphosphonic ester or diphosponium as defined in Claim 31, which is represented by the general formula (35) or (36) below.

General formula (35)

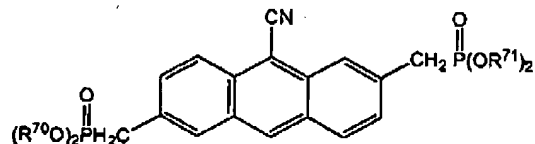


General formula (36)

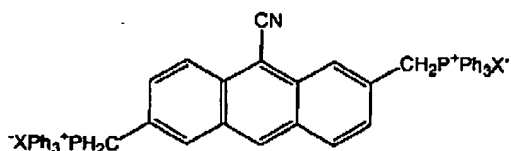
(where R^{70} , R^{71} , and X are defined as above.)

34. (Withdrawn) A diphosphonic ester or diphosponium as defined in Claim 31, which is represented by the general formula (37) or (38) below.

General formula (37)



General formula (38)

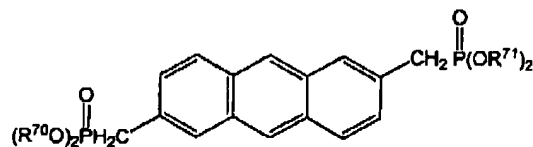
(where R^{70} , R^{71} , and X are defined as above.)

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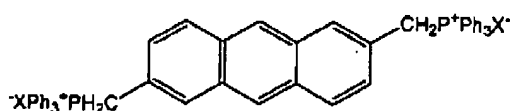
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35. (Withdrawn) A diphosphonic ester or diphosponium as defined in Claim 31, which is represented by the general formula (39) or (40) below.

General formula (39)



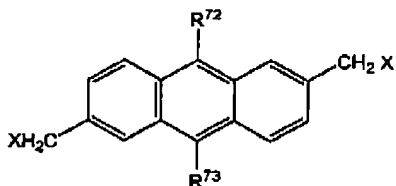
General formula (40)



(where R^{70} , R^{71} , and X are defined as above.)

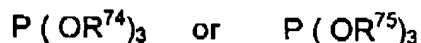
36. (Withdrawn) A process for producing a diphosphonic ester or diphosponium represented by the general formula [VII] or [VIII] below, said process comprising reacting an aryl halide compound represented by the general formula [IX] below and a trialkyl phosphite represented by the general formula [X] below or triphenyl phosphine (PPh_3).

General formula [IX]



(where R^{72} and R^{73} are identical or different, at least one of them denoting a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom, and X denotes a halogen atom.)

General formula [X]

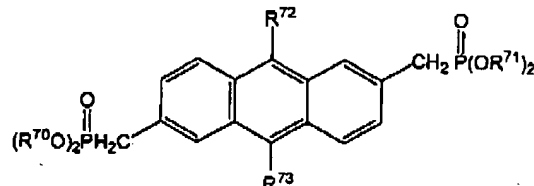


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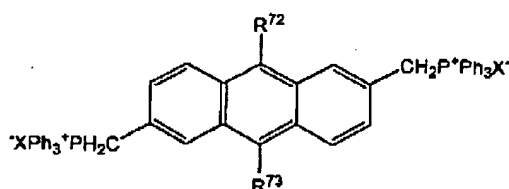
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(where R^{74} and R^{75} are identical or different, each denoting a hydrocarbon group.)

General formula [VII]



General formula [VIII]

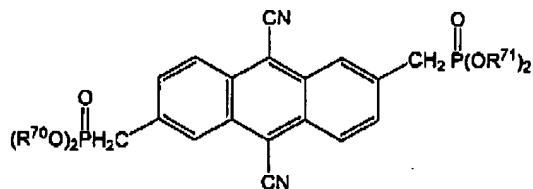


(where R^{70} and R^{71} are identical or different, each denoting a hydrocarbon group; and R^{72} , R^{73} , and X are defined as above.)

37. (Withdrawn) A process for producing a diphosphonic ester or diphosphonium as defined in Claim 36, wherein R^{70} and R^{71} each denotes a saturated hydrocarbon group having 1 to 4 carbon atoms.

38. (Withdrawn) A process for producing a diphosphonic ester or diphosphonium as defined in Claim 36, said process yielding a diphosphonic ester or diphosphonium represented by the general formula (35) or (36).

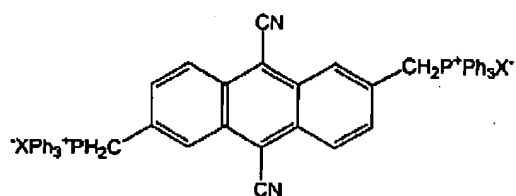
General formula (35)



General formula (36)

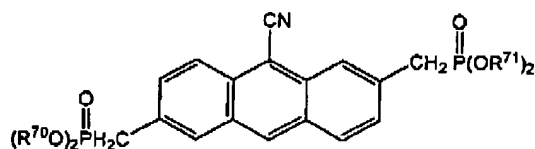
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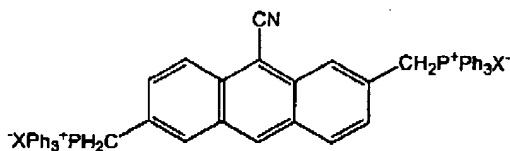
(where R^{70} , R^{71} , and X are defined as above.)

39. (Withdrawn) A process for producing a diphosphonic ester or diphosponium as defined in Claim 36, said process yielding a diphosphonic ester or diphosponium represented by the general formula (37) or (38).

General formula (37)

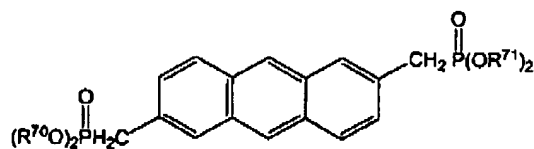


General formula (38)

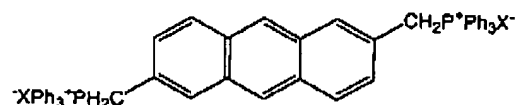
(where R^{70} , R^{71} , and X are defined as above.)

40. (Withdrawn) A process for producing a diphosphonic ester or diphosponium as defined in Claim 36, said process yielding a diphosphonic ester or diphosponium represented by the general formula (39) or (40).

General formula (39)



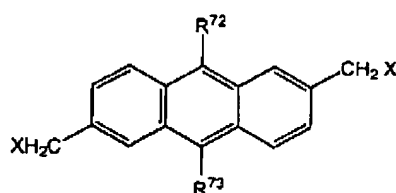
General formula (40)



(where R^{70} , R^{71} , and X are defined as above.)

41. (Withdrawn) An aryl halide compound represented by the general formula [IX] below.

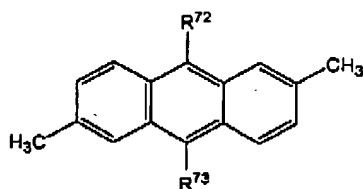
General formula [IX]



(where R^{72} and R^{73} are identical or different, at least one of them denoting a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom.)

42. (Withdrawn) A process for producing an aryl halide compound represented by the general formula [IX] below, said process comprising reacting an anthracene compound represented by the general formula [XI] below with an N-halogenated succinimide represented by the general formula [XII] below.

General formula [XI]

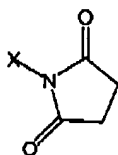


(where R^{72} and R^{73} are identical or different, at least one of them denoting a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom.)

General formula [XII]

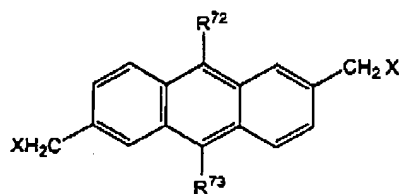
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(where X denotes a halogen atom.)

General formula [IX]



(where R⁷² and R⁷³ are defined as above, and X denotes a halogen atom.)

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